

Q.2 Write a program to simulate the working of stack using an array with the following:

- (a) Push
- (b) Pop
- (c) Display

The program should print appropriate messages for stack overflow, stack underflow.

A.

Push () -

- check if the stack is full
- If the stack is full, then display "Stack overflow"
- If the stack is not full, increment top to the next location
- Assign data to the top element

Algorithm - push () -

If $TOP \geq SIZE - 1$ then // stack overflow indicating ^{that the stack is full}
 $TOP = TOP + 1$
 $STACK[TOP] = ELEMENT$

Pop () -

- check if the stack is empty
- If the stack is empty, then display "stack Underflow"
- If the stack is not empty, copy top in a

- Temporary variable
- Decrement top to the previous location
- Delete the Temporary variable.

Algorithm - pop () -

IF $TOP = -1$ Then // Stack Underflow indicating that the stack is ~~full~~ EMPTY

~~$TOP = TOP + 1$~~

~~$STACK[TOP] = ELEMENT$~~

Return $STACK[TOP]$

$TOP = TOP - 1$

• Pseudo Code :

push (x)

{

$top \leftarrow top + 1$

$A[top] \leftarrow x$

}

pop ()

{

$Top \leftarrow top - 1$

}

top ()

{

return $A[top]$

}

Is Empty ()

{

if ($top == -1$)

return true;

else

return false;

Is Full ()

{

if ($top == size$)

return true;

else

return false;